

## UPDATE

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## EXTERIOR INSULATION & FINISH SYSTEMS (EIFS) LEAD TO WOOD DAMAGE & INFESTATION

PCOs have recently experienced many technical problems with a construction type known as Exterior Insulation and Finish Systems (EIFS). The product has a stucco-like appearance and is used to finish the exterior of commercial and residential buildings.

### PROBLEMS ENCOUNTERED WITH EIFS

From a pest control viewpoint, EIFS construction creates a serious pest control crisis.

- EIFS structures are very prone to moisture infiltration and infestation by insects and once infested, the systems are nearly impossible to treat.
- EIFS structures, which include rigid foam board, frequently extend below grade, which can wick up moisture and at the same time create an unseen route for termite entry.

Once moisture infiltrates the system, there is little chance of the system drying out. The excess moisture leads to wood decay and infestation by termites and carpenter ants. The homeowner rarely is aware of any problems until infestation or damage is apparent during remodeling. Usually by that time the house is no longer covered by the builder's warranty. The PCO who performed the pretreat cannot be responsible for poor workmanship by the builder which caused the infestation or wood decay. The owner has limited recourse against the builder.

The United States Army Corps of Engineers reported through its Construction Engineering Laboratories reports, that "Major failures, such as system delamination and cracking have occurred. The chief causes of these failures were design and application deficiencies." Upon cracking and delamination, the systems are very prone to moisture infiltration leading to wood decay and insect infestation.

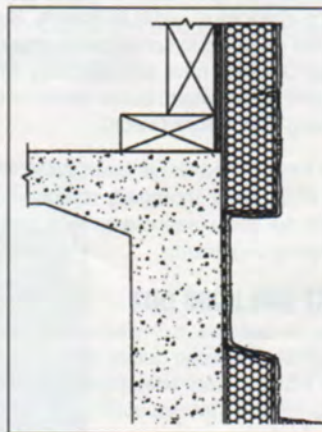
### HOW COMMON IS THE PROBLEM?

The EIFS crisis was carefully documented in North Carolina.

- The North Carolina Home Builder's Association says 95% of randomly tested houses have damage, with average repair costs between \$3,000 and \$5,000.
- The American Institute of Architects found moisture exceeding 20% in wood in 90% of the 205 EIFS houses tested. In testing conducted by the National Association of Home Builders (NAHB), moisture levels in wood have reached 50%.
- The EIFS Industry Member's Association (EIMA), a trade group of EIFS manufacturers and applicators, found damage exceeding \$1,500 in 60% of the houses tested with the remaining 40% tested resulting in between \$0 and \$1,500 damage. Though EIMA views the problem as regional, the National Association of Home Builders Research Center reports hotline calls from all over the country, thus refuting the EIMA assumption.
- Several builders have reported repairs costing between \$30,000 and \$100,000, with one insurance settlement recorded at \$417,000. Since EIFS houses are frequently higher end, some owners demand replacement of EIFS with traditional stucco. Such costs can easily exceed \$50,000.
- Moisture/termite/decay problems in EIFS houses have now been documented in 34 states.
- North Carolina now requires a disclosure statement to prospective buyers of EIFS houses. Property values for structures containing EIFS have decreased 10% to 30% in the past two years.

### WHO IS TO BLAME?

EIFS manufacturers blame the EIFS applicators, EIFS applicators blame the manufacturers, both blame the carpenters for improper installation of the doors and windows. Unfortunately, PCOs are commonly called in to control termites, carpenter ants, and decay. Further, PCOs may have performed a pretreat on an EIFS house without knowing that the home to be built was going to include EIFS until the PCO returned to treat the backfill.



*Detail shows termite detection port and not acceptable to NPCA and code officials in very heavy termite infestation areas.*

# NPCA Pest Management Library UPDATE

Homeowners have filed several suits against EIFS manufacturers. A Tacoma, Washington jury found that an EIFS manufacturer was not liable for damages due to a deficient product. While cases vary, the focus is now on installation of EIFS and design of construction. More suits are pending.

## BUILDERS LOSE EIFS LIABILITY INSURANCE

The Maryland Casualty Company, one of the nation's largest insurers of builders, has begun to exclude coverage for houses containing EIFS. In a letter to their insureds announcing the exclusion, Maryland Casualty states that "essentially, even the best builders cannot necessarily avoid claims if they use EIFS."

## MOISTURE TESTING

The National Association of Home Builders Research Center (NAHBRC) suggests that EIFS structures be tested for moisture. A protocol has been developed by NAHBRC and is used by professional firms engaged in testing EIFS homes for moisture. Homeowners can hire a firm to test their EIFS house for moisture. The cost is about \$250, on average. The NAHBRC suggests that if moisture exceeding 30% is found, then "further investigation of structural damage is recommended." Engineers have also documented trapped moisture originating from the interior of the house.

## WHAT HAVE EIFS MANUFACTURERS DONE?

EIFS manufacturers have taken steps to reduce the chances of water infiltration and infestation. First, manufacturers are looking at materials and testing new methods that will reduce chances of water infiltration. Second, the application specifications are more detailed including in some cases channels to divert water out of the wall once infiltrated. Design changes have provided only limited success. Third, most manufacturers now call for EIFS not to extend below grade or less than eight inches above grade (see Detail Showing Gap Above Grade).

Even though steps have been taken towards improvement, thousands of EIFS houses exist which were improperly designed, where EIFS were improperly installed, and extended into the soil, creating a serious condition, which could lead to infestation, by wood destroying organisms.

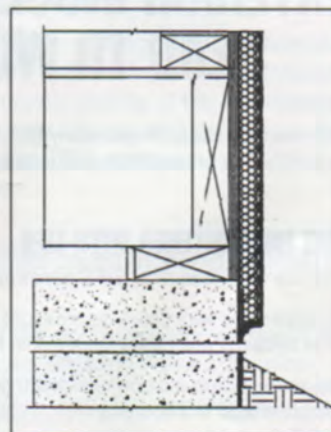
## WHAT CAN PCOS DO?

Since the builders, manufacturers of EIFS, and installers of EIFS might not assist homeowners, PCOs may be called to treat moisture problems, wood decay, termite infestation, and other insect infestation. In some cases, the houses may already be under contract. PCOs cannot adequately treat infested EIFS houses using liquid termiticides as foundation treatments unless the EIFS portion is removed for inspection and possible localized treatment. NPCA recommends the following:

1. Prior to performing a pretreat, ask if the house will be an EIFS house. If so, consider whether to issue any warranty or contract.
2. PCOs and their attorneys should review all warranties and contracts and update the warranties and contracts if EIFS construction is not specifically addressed. Many PCOs are excluding contracts on EIFS structures. If a warranty or contract is to be issued on EIFS houses, ask your general liability insurer to verify that you have insurance coverage if infestation should be discovered and damage is found.
3. Thoroughly explain to the homeowner the potential problems with EIFS as described in this Update. The homeowner should understand that EIFS houses are prone to water infiltration and infestation. Short of removing the EIFS, the house will be nearly impossible to treat using soil termiticides. Baits are an option, but remember that with EIFS, termites can remain in the structure and not return to the soil since there is adequate moisture to sustain infestation in the structure. Even if termites can be controlled, the moisture will lead to decay.
4. Do not use a liquid termiticide if the EIFS construction extends into the soil. The foam insulation used with EIFS is rigid foam board and is untreatable if below grade. Below grade installation is prohibited for new construction by code in many areas of very heavy termite infestation; however, many houses were built with the material below grade before the code change.
5. If the EIFS structure is a new account, urge the homeowner to hire a specialist to conduct a moisture survey. Some pest control firms are trained and capable of performing this service. The survey can be conducted using pin type meters or a flush non-penetrating meter such as WetWall.

## CONCLUSION

EIFS construction will lead to wood decay and infestation for years to come. The PCO must be informed and should follow the above suggestions from NPCA to protect the pest control company and the homeowner's investment. NPCA will keep PCOs informed of any breaking news on this subject.



*Detail showing gap above grade*



*A PCO's nightmare: Wood damage beneath a window in an EIFS building.*

Insert this update into the NPCA Pest Management WDO Library, which can be purchased from the Resource Center.

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## **AN INTRODUCTION TO EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)**

Exterior Insulation and Finish Systems (EIFS) have become a popular building style in the past several years. The EIFS construction type is generally used in commercial or expensive residential structures and looks like traditional stucco construction. EIFS were first used in Sweden in the 1940s and were used to repair buildings in Europe after World War II. EIFS were introduced to the United States in the late 1960s and became popular starting in the 1980s. The products commercially available have evolved over the last 20 years. EIFS construction is popular because the structure appears to be stucco, is very attractive, and EIFS buildings are very energy efficient due to the materials used.

*Examples of EIFS Buildings*



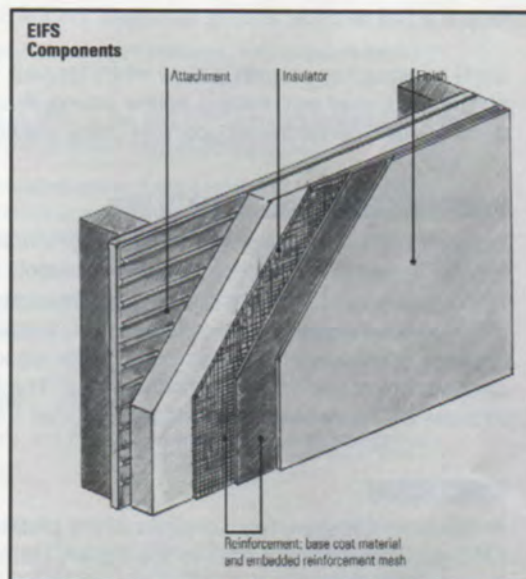
EIFS construction differs from most insulation systems in that the insulation is applied on the outside or exterior of the building. For this reason, EIFS can also be used as a cladding for older buildings. These "rehab" projects are most common on commercial buildings such as strip shopping malls or smaller office buildings.

### **DESIGN OF EIFS**

The EIFS construction includes the following:

- Substrate such as plywood attached to the wall studs
- Insulation board
- Reinforcing mesh
- Base coat of finish
- Acrylic copolymer or equivalent finish coat

Keep in mind that all of these materials are on the outside of the structure. For this reason, the manufacturers of the EIFS advertise the system as being energy efficient. The building is essentially clad in insulation with tight seals around windows and doors. Traditional insulation fits between the studs on the inside of the building and is subject to air infiltration. EIFS in theory reduce the air infiltration. According to the EIFS Industry Members Association (EIMA), EIFS can eliminate up to 55% of the air infiltration as compared to brick or wood construction.





*EIFS Building Detail*

## **BUILDING TRENDS**

NPCA estimates that up to 20% of the commercial buildings and 5% of the residential buildings use EIFS in the U.S. Since on residential buildings, EIFS are generally used on the upscale homes, NPCA estimates that in some areas, EIFS are used on up to 20% of the residential homes costing more than \$200,000. Sometimes on residential buildings, EIFS are used only on the facade and sides and rear walls are clad in siding. EIFS can also be used to provide intricate building details.

## **SKILLS REQUIRED**

EIFS installation is not an easy task for the average construction site finisher. Most EIFS manufacturers require that the installers be thoroughly trained. However, as with any construction, quality of the finished product varies from applicator to applicator. Code officials and EIFS manufacturers have raised several concerns about the EIFS applicators:

1. While applicator companies may be trained, untrained workers frequently install EIFS. This leads to variability in the quality and may lead to failures.
2. Unusual project details and angles not included in the training may lead to situations with which the applicator is not familiar.
3. Applicators may mix materials from several manufacturers thus voiding all warranties.
4. The substrate might be wet or out of tolerance. In addition, building materials used in the EIFS must be fully up to specification. Any wet, warped, or poor quality material will not permit proper installation of EIFS.
5. Flashing around the doors or windows might not be properly installed thus allowing water infiltration.
6. Since there are several types of EIFS, each job requires careful consideration. If a delicate EIFS is used in an area requiring a shatterproof EIFS, the system may become damaged and permit water to infiltrate.
7. Patching of damaged EIFS can be difficult.

## **HOW TO CHECK TO SEE IF A HOME HAS EIFS CONSTRUCTION**

The easiest way to determine whether a stucco-type structure has EIFS is to ask the owner. However, few owners, including builders, have a clear understanding of EIFS. In many cases, either the homeowner is not available or does not know whether the construction is EIFS. The PCO should look for starbursts on the exterior of EIFS where a ball or other activity damaged the EIFS on residential construction.

EIFS construction sounds hollow when tapped. However, some stucco finishes, depending on the type of substrate used, may also have a hollow sound. A small sharp object such as an ice pick will penetrate EIFS and will generally not penetrate stucco. Any holes created should be sealed.

## **PROBLEMS ENCOUNTERED WITH EIFS**

Builders began receiving reports of EIFS failures several years ago. EIFS failures, meaning allowing water and insects to penetrate the finish coat were widely reported. Once a failure occurs, EIFS behave nearly identically to rigid foam board in that insects and moisture are present inside and the structures are virtually untreatable by the PCO unless the material is removed from the building. On commercial steel frame buildings, the potential for wall damage from insects is not as great as for wood frame residential structures; however, commercial buildings under contract are equally difficult to treat. The NPCA position supporting a ban on rigid foam board below grade in areas of heavy termite infestation included EIFS.

## **CONCLUSION**

At this time there are few solutions to the problems that PCOs encounter when faced with EIFS. For details on EIFS problems, please refer to the Library Update (Exterior Insulation & Finish Systems (EIFS) Lead to Wood Damage & Infestation.)